Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US05/009219

International filing date: 18 March 2005 (18.03.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/554,849
Filing date: 19 March 2004 (19.03.2004)

Date of receipt at the International Bureau: 25 April 2005 (25.04.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1308053

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

April 13, 2005

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: *60/554,849*
FILING DATE: *March 19, 2004*
RELATED PCT APPLICATION NUMBER: *PCT/US05/09219*

Certified by

Jon W. Dudas

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

PTO xxxx
Approval for use through OMB 0651-00XX
Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 35 CFR 1.53 (c).

Docket Number	63,460	Type a plus sign (+) inside this box	+

INVENTOR(s)/APPLICANT(s)

LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)
Jensen	Jeff		Brownsburg, Indiana
Smith	Michelle		Carmel, Indiana
King	Ed		Indianapolis, Indiana

☐ *Additional inventors are being named on separately numbered sheets attached hereto*

TITLE OF THE INVENTION (280 characters max)

PESTICIDE COMPOSITIONS

CORRESPONDENCE ADDRESS

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, Indiana 46268

Telephone: 317-337-5115

Fax: 317-337-4847

ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification Number of Pages 36 ☐ Small Entity Statement

☐ Drawing(s) Number of Sheets ____ ☐ Other (specify) ____

METHOD OF PAYMENT (check one)

☐ A check or money order is enclosed to cover the Provisional filing fees ☒ The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number: 04-1529	PROVISIONAL FILING FEE AMOUNT	**$160.00**

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government

☒ No
☐ Yes, the name of the U.S. Government agency and the Government contract number are: ____

Respectfully submitted,

Craig E. Mixan

Craig E. Mixan
Registration No.: 32,709
Phone No.: 317-337-4812

March 19, 2004

EXPRESS MAIL MAILING NO.: EV120184725US
DATE OF DEPOSIT: March 19, 2004

PROVISIONAL APPLICATION FILING ONLY

PESTICIDE COMPOSITIONS

FIELD OF THE INVENTION

This invention is related to the field of compositions useful in the control of pests, for example, insects (such as cockroaches, termites, and ants) and rodents (such as rats and mice).

BACKGROUND OF THE INVENTION

Anaphylaxis is a severe allergic reaction to certain allergens. Anaphylaxis can, in untreated and severe cases, lead to death by suffocation. One main source of anaphylaxis is allergic reactions to certain foods. Experts estimate that about 2.5 percent of the U.S. population has food allergies. About 1 percent of the U.S. population is allergic to peanuts or tree nuts alone. Some 125 people in the U.S. die from anaphylaxis caused by food allergies every year.

The pest control industry uses peanut butter as an almost universal pest attractant, such as, using it in baits to attract and kill pests. Several years ago, Canadian pest management professionals stopped using peanut butter baits in pest control when the pest problem occurred in day cares, schools, and homes where children live. (See "Peanut Allergies and Pest Management" by R. Corrigan in Pest Control Technology, pages 98-99, June 2003).

Generally, in order for a bait to be practical the bait must be: (1) easy to store and keep fresh; and (2) easy to use and apply. Baits have been very successful in controlling most pest problems. This is especially true in the area of cockroach control. In fact, controlling cockroaches with baits has become the primary method to handle cockroach problems.

However, cockroaches learn fast from their environment and adapt rapidly. For example, a few years ago, roaches were found to have developed an aversion to glucose in the MAXFORCE® (Trademark of Bayer Environmental Science) bait stations. Here the solution was replace the glucose in the system with another sugar complex. Recently, however, it appears cockroaches have developed an aversion to the baits themselves regardless of the manufacturer. Solving this problem is very difficult, as one senior researcher recently said "It's hard to know what to change [in a bait] when you don't know what the problem is". (See "Stayin' Alive" by B Harbison, R. Kramer, and J. Dorsch in Pest Control Technology, pages 24-26, 28-29, and 83, January 2003).

This invention provides a solution to the problems summarized above.

BRIEF SUMMARY OF THE INVENTION

This invention provides pesticide compositions useful in the control of pests, for example, insects (such as cockroaches, termites, and ants) and

rodents (such as rats and mice) where such compositions comprise soynuts, a non-monosaccharide sugar, and a pesticide.

DETAILED DESCRIPTION OF THE INVENTION

PESTS

The inventive compositions are useful in controlling pests. For example, insects (such as cockroaches, termites, and ants) and rodents (such as rats and mice).

Further examples are:

(1) the order Lepidoptera for example, Acleris spp., Adoxophyes spp., Adoxophyes reticulana; Aegeria spp., Agrotis spp., Agrotis spinifera; Alabama argiliaceae, Amylois spp., Anticarsia gemmatalis, Archips spp., Argyrotaenia spp., Autographa spp., Busseola fusca, Cadra cautella, Carposina nipponensis, Chilo spp., Choristoneura spp., Clysia ambiguella, Cnaphalocrocis spp., Cnephasia spp., Cochylis spp., Coleophora spp., Crocidolomia binotalis, Cryptophlebia leucotreta, Cydia spp., Cydia pomonella; Diatraea spp., Diparopsis castanea, Earias spp., Ephestia spp., E. Khuniella; Eucosma spp., Eupoecilia ambiguella, Euproctis spp., Euxoa spp, Grapholita spp., Hedya nubiferana, Heliothis spp., H. Virescens und H. zea; Hellula undalis, Hyphantria cunea, Keiferia lycopersicella, Leucoptera scitella, Lithocollethis spp., Lobesiaspp, Lymantria spp., Lyonetia spp., Malacosoma

spp., Mamestra brassicae, Manduca sexta, Operophtera spp., Ostrinia nubilalis, Pammene spp., Pandemis spp., Panolis flammea, Pectinophora spp., Phthorimaea operculella, Pieris rapae, Pieris spp., Plutella xylostella, Prays spp., Scirpophaga spp., Sesamia spp., Sparganothis spp., Spodopteralittoralis, Synanthedon spp., Thaumetopoea spp., Tortrix spp., Trichoplusia ni and Yponomeuta spp.;

(2) the order Coleoptera, for example Agriotes spp., Anthonomus spp., Atomaria linearis, Chaetocnema tibialis, Cosmopolites spp., Curculio spp., Dermestes spp., Diabrotica spp., Epilachna spp., Eremnus spp., Leptinotarsa decemlineata, Lissorhoptrus spp., Melolontha spp., Oryzaephilus spp., Otiorhynchus spp., Phlyctinus spp., Popillia spp., Psylliodes spp., Rhizopertha spp., Scarabeidae, Sitophilus spp., Sitotroga spp., Tenebrio spp., Tribolium spp. and Trogoderma spp.;

(3) the order Isoptera, for example Reticulitermes spp.;

(4) the order Psocoptera, for example Liposcelis spp.;

(5) the order Anoplura, for example Haematopinus spp., Linognathus spp., Pediculus spp., Pemphigus spp. and Phylloxera spp.;

(6) the order Mallophaga, for example Damalinea spp. and Trichodectes spp.;

(7) the order Thysanoptera, for example Frankliniella spp., Hercinothrips spp., Taeniothrips spp., Thrips palmi, Thrips tabaci and Scirtothrips aurantii;

(8) the order Heteroptera, for example Cimex spp., Distantiella theobroma, Dysdercus spp., Euchistus spp. Eurygaster spp. Leptocorisa spp., Nezara spp., Piesma spp., Rhodnius spp., Sahlbergella singularis, Scotinophara spp. and Triatoma spp.;

(9) the order Homoptera, for example Aleurothrixus floccosus, Aleyrodes brassicae, Aonidiella aurantii, Aphididae, Aphis craccivora, A. fabae, A. gosypii; Aspidiotus spp., Bemisia tabaci, Ceroplaster spp., Chrysomphalus aonidium, Chrysomphalus dictyospermi, Coccus hesperidum, Empoasca spp., Eriosoma lanigerum, Erythroneura spp., Gascardia spp., Laodelphax spp., Lecanium comi, Lepidosaphes spp., Macrosiphus spp., Myzus spp., M.persicae; Nephotettix spp., N. cincticeps; Nilaparvata spp., N. lugens; Paratoria spp., Pemphigus spp., Planococcus spp., Pseudaulacaspis spp., Pseudococcus spp., P. Fragilis, P. citriculus and P. comstocki; Psylla spp., P. pyri; Pulvinaria aethiopica, Quadraspidiotus spp., Rhopalosiphum spp., Saissetia spp., Scaphoideus spp., Schizaphis spp., Sitobion spp., Trialeurodes vaporariorum, Trioza erytreae and Unaspis citri;

(10) the order Hymenoptera, for example Acromyrmex, Atta spp., Cephus spp., Diprion spp., Diprionidae, Gilpinia polytoma, Hoplocampa spp., Lasius spp., Monomorium pharaonis, Neodiprion spp., Solenopsis spp. and Vespa spp.;

(11) the order Diptera, for example Aedes spp., Antherigona soccata, Bibio hortulanus, Calliphora erythrocephala, Ceratitis spp., Chrysomyia spp., Culex spp., Cuterebra spp., Dacus spp., Drosophila melanogaster, Fannia spp., Gastrophilus spp., Glossina spp., Hypoderma spp., Hyppobosca spp., Liriomyza spp., Lucilia spp., Melanagromyza spp., Musca spp., Oestrus spp., Orseolia spp., Oscinella frit, Pegomya hyoscyami, Phorbia spp., Rhagoletis pomonella, Sciara spp., Stomoxys spp., Tabanus spp., Tannia spp. and Tipula spp.;

(12) the order Siphonaptera, for example Ceratophyllus spp. and Xenopsylla cheopis;

(13) the order Thysanura, for example Lepima saccharina and from the order Acarina, for example Acarus siro, Aceria sheldoni; Aculus spp., especially A. schlechtendali; Amblyomma spp., Argas spp., Boophilus spp., Brevipalpus spp., especially B. californicus and B. phoenicis; Bryobia praetiosa, Calipitrimerus spp., Chorioptes spp., Dermanyssus gallinae, Eotetranychus App., especially E. carpini and E. orientalis; Eriophyes spp.,

especially E. vitis; Hyalomma aspp., Ixodea spp., Olygonychus pratensis, Ornithodoros spp., Panonychus pp., especially P. ulmi and P. citri; Phyllocoptruta spp., especially P. oleivora; Polyphagotarsonemus spp., especially P. latus; Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Tarsonemus spp. and Tetranychus spp., in particular T. urticae, T. cinnabarinus and T. Kanzawai;

(14) the class Nematoda;

(A) nematodes selected from the group consisting of root knot nematodes, cyst-forming nematodes, stem eelworms and foliar nematodes;

(B) nematodes selected from the group consisting of Anguina spp.; Aphelenchoides spp.; Ditylenchus spp.; Globodera spp., Globodera rostochiensis; Heterodera spp., Heterodera avenae, Heterodera glycines, for example Heterodera schachtii or Heterodera trifolii; Longidorus spp.; Meloidogyne spp., for example Meoidogyne incognita or Meloidogyne javanica; Pratylenchus, for example Pratylenchus neglectans or Pratylenchus penetrans; Radopholus spp., for example Radopholus similis; Trichodorus spp.; Tylenchulus, for example Tylenchulus semipenetrans; and Xiphinema spp.; or

(C) nematodes selected from the group consisting of Heterodera spp., for example Heterodera glycines; and Meloidogyne spp., for example Meloidogyne incognita.

The inventive compositions are particularly useful for controlling cockroaches, termites, and ants.

Exemplary cockroaches controlled by the inventive compositions include Blattella germanica (L.), Blattella asahinai Mizukubo, Supella longipalpa (F.) Cariblatta lutea lutea (Saussure and Zehntner), Eurycotis floridana (Walker), Ischnoptera deropeltiformis (Brunner), Latiblattella rehni Hebard, Panchlora nivea (L.), Parcoblatta caudelli Hebard, Parcoblatta divisa (Saussure and Zehntner), Parcoblatta fulvescens (Saussure and Zehntner), Parcoblatta lata (Brunner), Blatta orientalis L., Periplaneta americana (L.), Periplaneta fuliginosa (Serville), Periplaneta australasiae (Fab.), Periplaneta brunnea Burmeister and Pycnoscelus surinamensis (L.).

SOYNUTS

Soynuts, in general, are whole soybeans that have been soaked in water and then baked until browned. Soynuts can be found in a variety of flavors, including chocolate-covered. High in protein and isoflavones, soynuts are similar in texture and flavor to peanuts. You can find soynuts in natural food stores and through mail-order catalogs. One preferred embodiment of

this invention is to use Soynut Butter. Soynut butter is made from whole soynuts that are then crushed and blended with soy oil and other ingredients. Soynut butter has a slightly nutty taste, significantly less fat than peanut butter and provides many other nutritional benefits as well. Soynut butter can be found in a few supermarkets, or through mail-order companies.

NON-MONOSACCHARIDE SUGARS

The sugars useful in this invention are the non-monosaccharides. In a preferred embodiment oligosaccharides (2-8 joined monosaccharides) are used, such as disaccharides, but in certain instances even polysaccharides (more than 8 joined monosaccharides) can be useful, especially with cellulose eating pests, such as, termites. Particularly preferred is sucrose and cellulose, especially in combination with each other to control wood eating pests such as termites. In one preferred embodiment a composition comprising both sucrose and cellulose is used to control termites and cockroaches. Cockroaches can tolerate certain levels of cellulose in the composition without significantly reducing the feeding activity of the roaches, while the higher cellulose level increases termite feeding activity. Results have indicated that adding an additional amount of cellulose (preferably alpha-cellulose or microcrystalline cellulose) in an amount of up to 20 percent (i.e. 20 parts added cellulose to 100 parts inventive compostion) can be used. It is

currently believed that up to about 100 parts added cellulose to 100 parts inventive compostion can be used successfully. Having one composition that can be used to control both types of pests in their separate environments is a great advantage of this particular embodiment.

PESTICIDES

The pesticide can be any pesticide suitable for control of the particular pest.

Examples of suitable insecticides that may be used are:

(a) Pyrethroids, such as permethrin, cypemethrin, fenvalerate, esfenvalerate, deltamethrin, cyhalothrin, lambda-cyhalothrin, gamma-cyhalothrin, bifenthrin, fenpropathrin, cyfluthrin, tefluthrin, fish safe pyrethroids (for example ethofenprox), natural pyrethrin, tetramethrin, s-bioallethrin, fenfluthrin, prallethrin,

5-benzyl-3-furylmethyl-(E)-(IR,3S)-2,2-dimethyl-3-(2-oxothiolan-3-ylidenemethyl) cyclopropane carboxylate, or any of their insecticidally active isomers;

(b) Organophosphates, such as, methidathion, chlorpyrifos-methyl, profenofos, sulprofos, acephate, methyl parathion, azinphos-methyl, demeton-s-methyl, heptenophos, thiometon, fenamiphos, monocrotophos, profenofos, triazophos, methamidophos, dimethoate, phosphamidon,

malathion, chlorpyrifos, chlorpyrifos-methyl, phosalone, terbufos, fensulfothion, fonofos, phorate, phoxim, pirimiphos-methyl, pirimiphos-ethyl, fenitrothion, fosthiazate or diazinon;

(c) Carbamates (including aryl carbamates), such as fenoxycarb, alanycarb, pirimicarb, triazamate, cloethocarb, carbofuran, furathiocarb, ethiofencarb, aldicarb, thiofurox, carbosulfan, bendiocarb, fenobucarb, propoxur, methomyl or oxamyl;

(d) Benzoyl ureas, such as lufenuron, novaluron, noviflumuron, teflubenzuron, diflubenzuron, triflumuron, hexaflumuron, flufenoxuron or chlorfluazuron;

(e) Organic tin compounds, such as cyhexatin, fenbutatin oxide or azocyclotin;

(f) Pyrazoles, such as tolfenpyrad, pyridaben, tebufenpyrad and fenpyroximate;

(g) Macrolides, such as avermectins or milbemycins, for example abamectin, emamectin benzoate, ivermectin, milbemycin, spinosad or azadirachtin;

(h) Hormones or pheromones;

(i) Organochlorine compounds such as endosulfan, benzene hexachloride, DDT, chlordane or dieldrin;

(j) Amidines, such as chlordimeform or amitraz;

(k) Fumigant agents, such as chloropicrin, dichloropropane, methyl bromide or metam;

(l) Chloronicotinyl compounds such as diofenolan, clothianidin, thiacloprid, imidacloprid, thiacloprid, acetamiprid, nitenpyram or thiamethoxam;

(m) Diacylhydrazines, such as halofenozide, tebufenozide, chromafenozide or methoxyfenozide;

(n) Diphenyl ethers, such as diofenolan or pyriproxifen;

(o) Indoxacarb;

(p) Chlorfenapyr;

(q) Pymetrozine;

(r) Diafenthiuron;

(s) Toxins of microbial origin such as B.acillus thuringiensis endo- or exotoxins;

(t) Phenylpyrazoles such as fipronil, vanilliprole, etiprole or acetoprole; or

(u) Pyridalyl.

In addition to the major chemical classes of pesticide listed above, other pesticides having particular targets may be employed if appropriate for the intended utility of the inventive compostion. For instance, selective insecticides for particular crops, for example stemborer specific insecticides (such as cartap) or hopper specific insecticides (such as buprofezin) for use in rice may be employed. Alternatively insecticides or acaricides specific for particular insect species/stages may also be included in the inventive compositions (for example acaricidal ovo-larvicides, such as clofentezine, flubenzimine, hexythiazox or tetradifon; acaricidal motilicides, such as dicofol or propargite; acaricides, such as acequinocyl, fenazaquin, spirodiclofen, etoxazole, bromopropylate or chlorobenzilate; or growth regulators, such as hydramethylnon, cyromazine, methoprene, chlorfluazuron or diflubenzuron).

Examples of suitable insecticide synergists insecticides that may be used as a further active ingredient in the inventive compositions include piperonyl butoxide, sesamex, safroxan and dodecyl imidazole.

Specific examples of preferred pesticides are thiamethoxam, abamectin, emamectin benzoate, spinosad, chlorpyrifos, chlorpyrifos-methyl, profenofos, lufenuron, indoxacarb, hydramethylnon, lambda-cyhalothrin, pymetrozine, pirimicarb, methidathion, imidacloprid, acetamiprid, thiacloprid,

fipronil, flufenoxuron, methoxyfenozide, chlorfenapyr, pyridaben, novaluron, noviflumuron, pyridalyl, propargite, sulfuramid, and piperonyl butoxide.

The pesticide can be microencapsulated wherein the microcapsule is semipermeable in the absence of free water and impermeable in a wet environment. This prevents the loss of pesticide by leaching, but permits release when the capsules are physically crushed, as during the act of chewing by pests. By using microencapsulated pesticides, the only substantial release of pesticide in the pest habitat is within the alimentary tracts of the target organisms. If the threat of leaching is not a factor or the pesticide is not repellent, it can be mixed directly into the inventive composition.

In general the amount of pesticide to use is not critical. Amounts from 0.001 to 50 weight percent based on the weight of the inventive composition can be used.

Preparation, Use, and Other Potential Ingredients

It should be readily noted that the inventive compositions should be substantially free of peanuts or tree nuts. The phrase "substantially free or peanuts or tree nuts" means that a ordinary person having a allergy to peanuts or tree nuts will not have anaphylaxis reaction to a compound when that person is exposed to such compound by touching such compound.

In a preferred embodiment the inventive compositions are hydrodynamic and function well in harsh microclimates or dynamic microclimates, such as an outdoor environment subject to typical circadian influences of temperature and moisture (See U.S. patent 5,968,540 the entire disclosure of which is hereby incorporated by reference). Under conditions of high moisture content in the air, the inventive compositions absorb water, then release it under more xeric conditions. Consequently, the inventive compositions in this one preferred embodiment continually charge and discharge moisture, which is one of the key components for arthropod survival. This release of moisture commonly occurs as temperatures rise with a concomitant drop in humidity. Higher temperatures increase the metabolism of insects. Subsequently, they have an increased need for food and for a good moisture provider.

In one preferred embodiment the inventive composition is in the form of a bait. The baits of the present invention are developed against highly preferable food substrates so that it is strongly attractive to well-fed insects. They contain several food components, that when combined, provide unexpected results in attractiveness and hydrodynamics. Flowable bait formulations can be made and delivered from a syringe- or tube- configuration

and use of small-aperture adapters allows the bait to be placed strategically in inaccessible areas, providing a high safety factor.

Any pesticide can be used as the active ingredient. Also, because the matrix is so hydrodynamic, it can be used as a substrate for biological control agents that commonly have high moisture requirements such as, for example, nematodes. A formable bait can be placed in any type of known bait station. It can also be applied to a rough surface, such as for example any type of mesh screening, such as for example wire, vinyl, fiberglass, aluminum, etc.; and applied to any surface.

To further increase the hydrodynamic character of the baits, high fructose corn syrup and glycerin are included with pregelatinized starches in the bait formulation. The use of a pregelatinized starch in the presence of glycerin forms a glycerostarch complex that greatly maintains pliability and adhesiveness of the material over time. This results in a bait that can be used under broad environmental conditions that include horizontal and vertical surfaces under changeable microclimates such as, for example, commercial kitchens characterized by stainless steel surfaces with high ambient temperatures and humidities.

Optional ingredients to the bait include a preservative to retard fungal growth and a protectant such as a bittering agent to provide a safety factor for exposed bait.

An attractant is defined as any substance or combination of substances which will lure pests, especially a broad spectrum of cockroach species and other insects. The attractants include, for example, corn distiller's dried grains with solubles, herein after referred to as C-DDGS, etc. and combinations thereof. U.S. Pat. No. 4,988,510 (Brenner et al), herein incorporated by reference in its entirety, discloses that corn distiller's dried grains (C-DDGS) with solubles obtained from nonbeverage alcohol production, is highly effective as a bait for most species of peridomestic cockroaches but is not attractive to mammals such as dogs, cats, raccoons, and wood rats. The most preferred C-DDGS, for the purposes of this disclosure, is DDG (distiller's dried grains with solubles) from MPG Ingredients of Illinois (Pekin IL 61555) which is strongly preferred by insects.

Humectants useful in the present invention include, for example, any hygroscopic substance or combination of substances that draw moisture from the air, allowing the bait formulation to remain relatively moist and pliable. Sugars such as for example high fructose corn syrup, polyhydroxy alcohols such as glycerin, combinations thereof, etc. are exemplary of the substances

useful for this purpose. Some humectants, such as sugars, provide the further advantage of enhancing the attractiveness of the bait. A most preferred humectant is a combination of glycerin and corn syrup wherein the corn syrup is 95% fructose (Archer Daniels Midland (ADM) high fructose corn syrup).

Gel formers for use herein provide an elastic, cohesive matrix that holds the attractant together in combination with other bait ingredients. Any gelling agent that is not repulsive to pest such as insects can be used, provided that the resultant matrix freely releases the aromatic elements of the attractants. Examples of useful gelling agents include pregelatinized wheat starch, found to be superior to all other starches; pregelatinized tapioca, pregelatinized potato, and pregelatinized corn starch. Corn is also found to be an excellent starch for a food attractant. The starches useful in the invention include, for example, pregelatinized wheat starch such as for example PAYGEL®. (ADM Decatur, Ill. 62549) pregelatinized tapioca, such as for example STA-SLIM 150®. (A. E. Staley, Decatur IL 62525) pregelatinized potato, such as for example STA-SLIM 142®. (A. E. Staley) pregelatinized corn starch such as for example MIRA-GEL® etc. These starches are used both for the flowable and the formable baits. The most preferred gelling agent is PAYGEL 290®. (ADM ARKADY, Olathe KS 66061). When a formable bait is desired, a second gel former is added. This second gel former includes any

animal gelatin such as, for example, pork, beef, horse, etc. Pork gel (Rousselot Inc. Debuque, IA 52001) is most preferred.

Preservatives are optional in the baits of the invention but are recommended for baits used in very humid or moist conditions. Examples of preservatives useful in the present invention are 1,2-benzisothiazolin-3-one (PROXEL GXL®., Avecia Inc. Wilmington, Del. 19850) methyl paraben (p-hydroxybenzoic acid methyl ester) and propyl paraben (n-propyl p-hydroxybenzoate). Other known fungistats would also be effective in increasing the longevity of the bait and retarding mold growth.

Each component of the inventive compositions should be present in an effective amount. The expression "effective amount" is defined herein to mean that amount which is necessary to achieve the intended result of the component in question. For, example, an effective amount of the pesticide is that level or concentration which will kill significantly more target insects when the bait is consumed than when an equivalent amount of bait is consumed without the insecticide present.

On a weight basis the ratio of soynut : sugar (non-monosaccharide) should be about 1 part soynut to about 0.01 parts to about 0.50 parts sugar (non-monosaccharide). In a preferred embodiment, when soynut butter is used, the weight ratio of soynut butter : sugar (non-monosaccharide) should

be about 1 part soynut butter to about 0.1 parts to about 0.3 parts sugar(non-monosaccharide). However, in general the amount of soynut, preferably soynut butter, is greater than the amount of (non-monosaccharide) sugar and these ratios can be varied widely, in order to attract a certain pest.

In a preferred embodiment, on a dry weight basis, the components of a bait composition optional ingredients will typically be present in about the following amounts:

(a) 5-90%, 10-60% preferred and 10-35% most preferred for the attractant;

(b) 0.1-20%, 5-60% preferred and 40-60% most preferred for the humectant;

(c) 1-30%, 1-20% preferred and 2-15% most preferred for the gel former; and

(d) 0-5% preferred and 0-2% most preferred for the protectant.

To prepare the inventive compositions the soynuts, sugar (non-monosaccharide), and pesticide and other desired components are mixed together to form a homogenous or heterogeneous mixture. Generally, the more coarse the soynuts the more heterogeneous the mixture. The order of addition is not consider to be critical.

To apply a preferred embodiment of the inventive compositions, a flowable bait can be dispensed from a syringe- or tube-configuration and the use of small-aperture adapters allows the bait to be placed strategically in inaccessible areas, providing a high safety factor. A formable bait can be rolled and cut into any shape and size. It can be placed in any type of bait station or applied to any type of adhering surface such as for example applying it to a mesh screen, VELCRO, etc., and attached to any surface.

The Headings used herein are meant to be as a guide and not meant to be used to interpret the scope of the invention.

EXAMPLES

These examples are provided to illustrate the invention. They are not to be used for limiting the scope of the invention.

Example A : Preparation of insecticide concentrate.

An insecticide concentrate was prepared as follows: 615 grams of noviflumuron; 3.69 grams of Dow Corning Antifoam B (antifoam); 127.92 grams of Pluronic P-104 (dispersant); 8.61 grams of Proxel GXL (protectant) and 474.78 grams of water were milled together to form an insecticide concentrate.

Example One: Preparation of an Inventive Composition

An inventive composition in a preferred embodiment was made.

All the following additions were conducted by mixing the components together. To 10.13 grams of water was added 0.49 grams of sucrose. This was followed by the addition of 0.50 grams of insect concentrate (See Example A). This was followed by the addition of 0.10 grams of Proxel GXL. This was followed the addition of 4.14 grams of glycerin (Glycerin 96% USP Dow Chemical Co. Midland, MI 48674). This was followed by the addition of 18.68 grams of fructose corn syrup (CornSweet 95 High Fructose Corn Syrup, ADM Decatur IL 62549). This was followed by the addition of 2.59 grams of Paygel 290 and 10.95 grams of DDG. This was followed by the addition of 2.49 grams of soynut butter (The SoyNut Butter Co, Glenview, IL 60025). The mixture was mixed until substantially homogenous.

Example Two:

Peanut Butter vs.

Soynut Butter (without non-monosaccharide sugar) vs.

Inventive Compostion in preferred embodiment (Soynut Butter with non-monosaccharide sugar)

This is a paired comparison test of the above compositions exposed to mixed populations of German cockroach and tested as follows.

The Peanut Butter Composition was made as follows. All the following additions were conducted by mixing the components together. To 10.62

grams of water was added 0.50 grams of insect concentrate (See Example A). This was followed by the addition of 0.10 grams of Proxel GXL. This was followed the addition of 4.14 grams of glycerin (Glycerin 96% USP, The Dow Chemical Co., Midland, MI 48674). This was followed by the addition of 18.68 grams of fructose corn syrup (CornSweet 95 High Fructose Corn Syrup, ADM, Decatur, IL 62549). This was followed by the addition of 2.59 grams of Paygel 290 and 10.95 grams of DDG. This was followed by the addition of 2.49 grams of Peanut butter (The J. M. Smucker Co., Orrville, OH 44667). The mixture was mixed until substantially homogenous.

The Soynut Butter Composition was made as follows. All the following additions were conducted by mixing the components together. To 10.62 grams of water was added 0.50 grams of insect concentrate (See Example A). This was followed by the addition of 0.10 grams of Proxel GXL. This was followed by the addition of 4.14 grams of glycerin (Glycerin 96% USP, The Dow Chemical Co., Midland, MI 48674). This was followed by the addition of 18.68 grams of fructose corn syrup (CornSweet 95 High Fructose Corn Syrup, ADM, Decatur, IL 62549). This was followed by the addition of 2.59 grams of Paygel 290 and 10.95 grams of DDG. This was followed by the addition of 2.49 grams of Soynut butter (The SoyNut Butter Co, Glenview, IL 60025). The mixture was mixed until substantially homogenous.

The tests were conducted in a 8.3-L rectangular plastic container with choice testing sites and also having PVC harborage and water vials. The temperature was held at 25°C and the RH was held at 50-60%.

The desire compositions in weigh trays (2 g) were placed on opposite sides of the arena. All formulations contained 0.5% noviflumuron. One hundred German cockroaches per replicate (80 mid-stage nymphs + 10 adult males + 10 adult non-gravid females) were used. There were six reps per choice test. Consumption on each bait measured after 7 days of exposure.

As shown in TABLE 2-1, the peanut butter composition was significantly preferred over the soynut butter alternative. The calculated palatability ratio showed 1.5x greater consumption of the peanut butter bait. However, there was a statistically neutral feeding response when the Inventive Composition was compared to the peanut butter bait, with nearly identical consumption of each formulation.

TABLE 2-1. Feeding response of German Cockroach

Choice	mg consumed after 7 days Mean ± SEM	Palatability Ratio
Peanut Butter (PB) vs. Soynut Butter (SB)	465.50 ± 23.2 a 301.50 ± 45.5 b *(p value = 0.011)*	PB/SB 1.54
PB vs. Inventive Composition SB + 1% sucrose (SBS)	326.60 ± 32.4 a 339.70 ± 37.9 a *(p value = 0.717)*	PB/SBS 0.96

This shows that soynut butter alone is not able to attract cockroaches alone, but unexpectedly, soynut butter with added sucrose (a disaccharide) is attractive to cockroaches. This is in spite of the fact that significant amount of monosaccharide were used in each compostion (Fructose corn syrup).

Example Three: Inventive vs. Commercial

This is a paired comparison between two different bait formulations on mid-stage American cockroach nymphs, tested as follows.

The tests were conducted in a 8.3-L rectangular plastic container with choice testing sites and also having PVC harborage and water vials. The temperature was held at 25°C and the RH was held at 50-60%.

MAXFORCE was used as the commercial comparative composition. It is the leading product in this field. A preferred embodiment of our inventive composition was made in accordance with Example One.

The desire compositions in weigh trays (2 g) were placed on opposite sides of the arena. All formulations contained 0.5% Noviflumuron. Twenty American cockroach nymphs per replicate. There were five reps per choice test. Consumption on each bait measured after 2 days of exposure.

As shown in TABLE 3-1, American cockroach nymphs showed that when compared to MAXFORCE, an inventive formulation was

overwhelmingly preferred, with little or no consumption measured on MAXFORCE.

TABLE 3-1. Feeding response of American cockroach to bait choices.		
Choice	mg consumed after 2 days Mean ± SEM	Palatability Ratio Inventive/MAXFORCE
Inventive vs. MAXFORCE	144.7 ± 41.6 a 0.0 ± 0.0 b *(p value < 0.0001)*	∞

Example 4: Bait Aversion Test

A blank (no insecticide) composition made in accordance with Example One ("Blank Inventive Compostion") was evaluated against one lab susceptible strain (Orlando Normal Strain) and 2 bait aversive field German cockroaches strains (Miami Strain and New York Strain). MAXFORCE® FC Professional Insect Control® Roach Bait (a.i. 0.01% fipronil; Trademarks of Bayer Environmental Science) and Purina dog chow (Nestlé Purina PetCare) were used as standard.

Cockroaches were maintained in lab with a temperature of 27 ±1 °C and a humidity of about around 50% RH under 12 hours light: 12 hours dark. Dog chow and water were provided *ad libitum*. Lab susceptible Orlando Normal strain cockroaches were reared in lab without ever being exposed to any insecticides. Field strains were collected within the last 5 years and reared in lab under the similar conditions with light selection pressure of

MAXFORCE FC gel. The field cockroach strains are particularly susceptible to a yeast infestation and may suffer seriously occasionally. Two field collected strains were used in this study: Miami strain and New York strain, both are bait resistant. A light infestation of the yeast problem on the New York strain colony was noted at the time of the experiment.

For both Orlando Normal strain and Miami bait resistant strain, about 500 mixed stages of cockroaches (adults and mid-large nymphs) were placed into each of the 4 arenas (40 x 27 x 21 cm) with food, water, and harborages and acclimated for 3 days in the same lab condition as above. Somewhat fewer (about 300-400) cockroaches were used for the New York strain. In the middle of the photo phase, cockroach arenas were cleaned and all food (dog chow) removed from the arenas. About 6 hr later, baits were placed inside the arenas to start the bait consumption study.

Baits were placed inside small plastic Petri dishes and bait weights were measured prior to placement and at the end of the experiment which lasts about 24 hrs. Bait consumption was calculated by subtracting weight loss in control from the weight loss in the treatments. The bait treatments were placed side by side within the arenas and their relative locations were randomized. Water loss controls were placed inside one of the arenas in a

plastic dish coated with Vaseline on outside to prevent cockroaches from entering.

The Blank Inventive Compostion bait was always the most preferred bait in all replicates with the Orlando Normal strain. The Blank Inventive Compostion bait was consumed significantly more than either MAXFORCE FC gel or dog chow ($F=78.35$, $p<0.001$). The Blank Inventive Compostion bait was consumed about 7 times more than the amount on MAXFORCE FC gel and nearly twice as much as the dog chow. These results indicate that Blank Inventive Compostion bait are much more palatable than MAXFORCE FC gel and even better than dog chow.

The Miami strain cockroaches consumed very little of the MAXFORCE FC gel. Significant higher consumption was observed on the Blank Inventive Compostion bait than on the FC gel. In fact, the bait consumption on the Blank Inventive Compostion bait was 17 times of that on MAXFORCE FC gel. This data showed that the Blank Inventive Compostion bait was much more preferred by bait resistant cockroaches when compare to MAXFORCE FC gel.

However, the Miami Strain cockroaches preferred dog chow over the Blank Inventive Compostion baits. Consumptions on the Blank Inventive Compostion bait was about half of that on dog chow. This is rather different from that pattern observed on lab susceptible strain which consumed more

Blank Inventive Compostion bait than dog chow. All these data showed that MAXFORCE FC gel is particularly not palatable to the Miami strain cockroaches, suggesting a strong case of bait aversion.

The New York strain was not much different. Again, consumptions on the MAXFORCE FC gel were low. The Blank Inventive Compostion bait was preferred in all replicates. The Blank Inventive Compostion bait was consumed significantly more than the MAXFORCE FC gel and dog chow. The consumptions of the Blank Inventive Compostion bait was about 13 times of MAXFORCE FC gel and 2 times of the dog chow.

The results showed that the Blank Inventive Compostion bait was highly palatable against both lab and field bait resistant strains of German cockroaches.

While the toxic MAXFORCE FC gel containing 0.01% fipronil was used in the comparison, it is highly likely these comparisons reflect the comparison of bait matrixes. There has not been any report indicating fipronil has any deterrent effect on feeding. In fact, the only published data showed that bait containing fipronil was consumed more than that of the same bait matrix containing either hydramethylnon and or chlorpyrifos. See "Effects of fipronil on bait formulation-based aversion in the German cockroach (Dictyoptera: Blattellidae) by Silverman, J. and D. Liang in J. Econ. Entomol. 92:886-889

(1999). Additionally, another reason for using MAXFORCE FC gel, besides its dominance in the market, was that a blank MAXFORCE FC gel was unavailable for comparison.

Example 5: Field Comparison: Inventive Composition vs. Commercial Product.

This field comparison was conducted at two multifamily apartment complexes. Each building in each complex contained 4-6 apartments.

The field comparison was initiated by sampling population densities of cockroaches in order to determine the apartments to include in the comparison. Each apartment was divided into six sampling zones: (1) the cabinetry under the kitchen sink; (2) the cabinetry above the kitchen sink; (3) the stove; (4) the refrigerator; (5) the utility room (area around water heater and furnace); and (6) the floor behind the toilet.

Cockroach population densities were sampled in each apartment by placing one sticky trap (18.7 x 9.0 cm)(Trapper® Monitor & Insect Trap, Bell Laboratories Inc.) in each sampling zone. The traps were retrieved 24 hours later. Trap catches were recorded as the number of males, females, gravid females, large nymphs (instars 4 – 6), and small nymphs (instars 1-3). Apartments with a minimum of 12 cockroaches caught in six traps were selected.

An inventive composition, in a preferred embodiment made in accordance with Example One, and a commercial product (MAXFORCE® FC Professional Insect Control®) were randomly assigned in a manner so that the apartments in the same building received the same treatment (either inventive composition or commercial product).

Bait treatments were applied to cracks and cervices (>50 spots) in the kitchen, utility room, bathroom, and living room following the rate indicated in Table 5-1. Re-treatments were made in apartments with high populations, where all the bait had been consumed (Table 5-2).

Table 5-1 Bait Treatment Rate

Cockroaches/6 traps	Inventive Composition (grams)	Commercial Product (grams)
12 to 50	15	15
50 to 100	20	15
100 to 300	25 to 30	20
300 to 600	30 to 40	25
600 to 900	40 to 50	30
>900	50 to 75	35

Table 5-2 Number of Apartments Receiving Re-treatments

Week	Commercial Product	Inventive Composition
2	1	0
4	4	3
8	1	0
12	1	0

Post-treatment monitoring was conducted at 2, 4, 8, 12, and 16 weeks using the same methods and materials as those for sampling of pre-treatment populations. Pre and post treatment population densities of each apartment were estimated by the average number of cockroaches caught in 6 traps. Post treatment population reduction was calculated for each of the test apartments by sampling intervals using the following formula.

(pre-treatment count – post treatment count at week X)/pre-treatment count

where X is the sampling interval

Both treatments caused apparent cockroach population reduction 2 weeks after treatment each causing a mean 27-32 percent reduction. After 4 weeks both treatments caused a mean 50-58 percent reduction. After 8 weeks the MAXFORCE caused a mean 50 percent reduction whereas, the inventive composition caused a mean 85 percent reduction. At 12 weeks the MAXFORCE caused a mean 28 percent reduction whereas, the inventive composition caused a mean 70 percent reduction. At 16 weeks the MAXFORCE caused a mean 5 percent reduction whereas, the inventive composition caused a mean 70 percent reduction. This shows that the inventive composition had better control than the commercial product at 8, 12, and 16 weeks based on the mean reduction of cockroaches.

This shows that the inventive composition performed as well as the commercial product at the 2 week interval, and performed better than the commercial product after the 8 week interval thereby giving long-term protection.

WE CLAIM

1. A composition comprising:

(a) soynuts;

(b) a non-monosaccharide sugar; and

(c) pesticide.

2. A composition comprising:

(a) soynut butter;

(b) a non-monosaccharide sugar; and

(c) pesticide.

3. A composition comprising:

(a) soynuts;

(b) sucrose; and

(c) pesticide.

4. A composition comprising:

(a) soynut butter;

(b) sucrose; and

(c) pesticide.

5. A process comprising applying any of the compositions according to claims 1-4 to the locus of a pest in an amount effective to lower the number of such pests in such locus.

6. A process comprising mixing the components of any the compositions according to claims 1-4 to produce a compostion according to claims 1-4.

ABSTRACT OF THE DISCLOSURE

This invention is related to the field of compositions useful in the control of pests, for example, insects (such as cockroaches, termites, and ants) and rodents (such as rats and mice), where such compositions comprise soynuts, a non-monosaccharide sugar, and a pesticide.